

Annual Report 2008

Production Sector

OMB Control No. 2060-0328
Expires 07/31/2011



Company Information

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Access 7/7/09 RL
iSTAR 7/7/09 RL
QA/QC 7/8/09 OF

Company Information Updated: No

Activities Reported

BMP1: Yes BMP2: No BMP3: Yes

Total Methane Emission Reductions Reported This Year: 367,452

Previous Years' Activities Reported: No

Period Covered by Report

From: 01/01/2008

To: 12/31/2008

☒ I hereby certify the accuracy of the data contained in this report.

Additional Comments

Noble Energy, Inc. (NEI) is pleased to submit the enclosed Annual Report detailing our participation in the EPA Natural Gas STAR Program in 2008.

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BMP1: Identify and Replace High-Bleed Pneumatic Devices

Current Year Activities

A. Facility/location identifier information:

Piceance (CO) ✓

B. Facility Summary

Number of devices replaced this reporting period: 448 devices

Percent of system now equipped with low/no-bleed units: 100 % ✓

C. Cost Summary

Estimated cost per replacement (including equipment and labor): \$ 300 ✓

D. Methane Emissions Reduction

Method Used: Other ✓

Data Source: Not Applicable ✓

Methane Emissions Reduction: 83,000 Mcf/year ✓

Low-Bleed:

Field survey measurements, representing 4 types of low-bleed controllers and a total of about 120 devices, yielded results that ranged from 1-20 cf gas/device-day. Therefore, a conservative low-bleed emission factor of 50 cf gas/device-day was used in the calculations.

Low-bleed device emission factor =

50 cf gas/device-day = 18 Mcf gas/device-yr =

42 cf CH₄/device-day* = 15 Mcf CH₄/device-yr*.(*Assumes field gas is 84.3% CH₄) ✓

High-bleed:

The GRI/EPA 1996 industry standard high-bleed emission factor was used in the calculations.

High-bleed device emission factor =

654 cf gas/device-day = 239 Mcf gas/device-yr =

551 cf CH₄/device-day* = 201 Mcf CH₄/device-yr*.(*Assumes field gas is 84.3% CH₄)

Please note: the annual methane emission reduction represented above assumes a full year of operation. Actual 2008 methane emission reductions were less because the continuous-bleed level controllers were retrofitted throughout the second half of 2008.

E. Are these emissions reductions a one-year reduction or a multi-year reduction?

One-year

✓ Multi-year

If Multi-year: ✓✓

Partner will report this activity once and let EPA automatically calculate future emission reductions based on sunset date duration (BMP 1 has a sunset period of 7 years).

Partner will report this activity annually up to allowed sunset date.

F. Total Value of Gas Saved

Value of Gas Saved: \$ 370,000 ✓

\$ / Mcf used: \$ 3.75

G. Planned Future Activities

Number of high-bleed devices to be replaced next year: _____ devices

July 02, 2009

Natural Gas STAR Online Reporting

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Previous Years' Activities

Year	Number of Devices Replaced	Total Cost * (\$)	Estimated Reductions (Mcf/Yr)	Value of Gas Saved (\$)

* Total cost of replacements (including equipment and labor)

Additional Comments

Please Note:



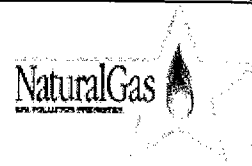
- 1) In the Piceance operations area, 100% of the Cemco 6900 continuous-bleed level controllers were retrofitted into low-bleed controllers.
- 2) Actual 2008 cost savings were less than reported because the continuous-bleed level controllers were retrofitted throughout the second half of 2008.
- 3) NEI will be evaluating the retrofit or replacement of high-bleed controllers in the Mid-Continent operations area in 2009.

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BMP1: Identify and Replace High-Bleed Pneumatic Devices

Current Year Activities

A. Facility/location identifier information:

Wattenberg (CO) ✓

B. Facility Summary

Number of devices replaced this reporting period: 1,466 devices ✓

Percent of system now equipped with low/no-bleed units: 100 % ✓

C. Cost Summary

Estimated cost per replacement (including equipment and labor): \$ 300 ✓

D. Methane Emissions Reduction

Method Used: Other ✓

Data Source: Not Applicable ✓

Methane Emissions Reduction: 260,000 Mcf/year ✓

Low-bleed:

Field survey measurements, representing 4 types of low-bleed controllers and a total of about 120 devices, yielded results that ranged from 1–20 cf gas/device-day. Therefore, a conservative low-bleed emission factor of 50 cf gas/device-day was used in the calculations.

Low-bleed device emission factor =

50 cf gas/device-day = 18 Mcf gas/device-yr = ✓

40 cf CH₄/device-day* = 15 Mcf CH₄/device-yr*.(*Assumes field gas is 79.8% CH₄)

High-bleed:

The GRI/EPA 1996 industry standard high-bleed emission factor was used in the calculations.

High-bleed device emission factor =

654 cf gas/device-day = 239 Mcf gas/device-yr =

522 cf CH₄/device-day* = 191 Mcf CH₄/device-yr*.(*Assumes field gas is 79.8% CH₄)

Please note: the annual methane emission reduction represented above assumes a full year of operation. Actual 2008 methane emission reductions were less because the continuous-bleed level controllers were retrofitted throughout the second half of 2008.

E. Are these emissions reductions a one-year reduction or a multi-year reduction?

One-year

✓

✓

Multi-year

If Multi-year:

✓ ✓

Partner will report this activity once and let EPA automatically calculate future emission reductions based on sunset date duration (BMP 1 has a sunset period of 7 years).

Partner will report this activity annually up to allowed sunset date.

F. Total Value of Gas Saved

Value of Gas Saved: \$ 1,200,000 ✓

\$ / Mcf used: \$ 3.75

G. Planned Future Activities

Number of high-bleed devices to be replaced next year: _____ devices

July 02, 2009

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Previous Years' Activities

Year	Number of Devices Replaced	Total Cost * (\$)	Estimated Reductions (Mcf/Yr)	Value of Gas Saved (\$)

* Total cost of replacements (including equipment and labor)

Additional Comments

Please note: ✓

- 1) In the Wattenberg operations area, 100% of the Cemco 6900 continuous-bleed level controllers, previously found on the glycol separators and on the top vessel of the HLP separators, were retrofitted into low-bleed controllers.
- 2) Actual 2008 cost savings were less than reported because the continuous-bleed level controllers were retrofitted throughout the second half of 2008.
- 3) NEI will be evaluating the retrofit or replacement of high-bleed controllers in the Mid-Continent operations area in 2009.

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BMP3: Partner Reported Opportunities (PROs)

Current Year Activities

A. Facility/location identifier information:

Wattenberg (CO) ✓

B. Description of PRO

Please specify the technology or practice that was implemented:

Perform reduced emissions completions ✓

Please describe how your company implemented this PRO:

A separator was used to separate the flowback liquid from the flowback gas. This allowed 100% of the gas portion of the flowback stream to be routed to a sales line or flare instead of being vented as before. Two green flowback separators were rented and used throughout the Wattenberg operations area in 2008. ✓

C. Level of Implementation

Other: 145 green flowbacks were completed in 2008 in the Wattenberg operations area. The gas from 60% of these green flowbacks was sold, and the gas from 40% of these green flowbacks was flared. ✓

D. Methane Emissions Reduction

Methane Emissions Reduction: 19,000 Mcf/year ✓

Basis for the emissions reduction estimate: Other ✓

In the past, initial flowback gas in the Wattenberg operations area was vented because it was not of pipeline quality. As described above, 2008 with the use of green flowback separators, this previously vented gas was either sold or flared. Field measurements showed that the amount of gas sold or flared was, on average, 166 Mcf gas per flowback.

Approximately 60% of the 19,000 Mcf CH₄* (11,500 Mcf CH₄*) was sold instead of vented. ✓
(*Assumes field gas is 79.8% CH₄)

Approximately 40% of the 19,000 Mcf CH₄* (7,500 Mcf CH₄**) was flared instead of vented.
(*Assumes field gas is 79.8% CH₄)
(**Assumes 98% control efficiency for the flares & assumes field gas is 79.8% CH₄)

E. Are these emissions reductions a one-year reduction or a multi-year reduction?

✓ ✓ One-year

Multi-year

If Multi-year:

Partner will report this activity once and let EPA automatically calculate future emission reductions based on sunset date duration.

Partner will report this activity annually up to allowed sunset date.

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**F. Cost Summary**

Estimated cost of implementing the PRO (including equipment and labor): \$ 10,500 ✓

G. Total Value of Gas Saved

Value of Gas Saved: \$ 71,250 ✓

\$ / Mcf used: \$ 3.75

H. Planned Future Activities

To what extent do you expect to implement this PRO next year?: NEI is reevaluating the practice of green flowbacks in Wattenberg for 2009. ✓

Previous Years' Activities

Year	Frequency of practice/activity or # of Installations	Total Cost * (\$)	Estimated Reductions (Mcf/Yr)	Value of Gas Saved (\$)

* Total cost of practice/activity (including equipment and labor)

Additional Comments

Please note: ✓

1) The reported cost of \$10,500 is the implementation cost per flowback.

2) The reported total value of gas saved, \$71,250, only accounts for the portion of the flowback gas that was sold instead of vented. A monetary value was not attached to the flared portion of the non-vented flowback gas because flaring is not considered a "beneficial" alternative to venting.

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BMP3: Partner Reported Opportunities (PROs)

Current Year Activities

A. Facility/location identifier information:

Iron Horse (WY) ✓

B. Description of PRO

Please specify the technology or practice that was implemented:

Perform reduced emissions completions ✓

Please describe how your company implemented this PRO:

A separator was used to separate the flowback liquid from the flowback gas. Through the implementation of this practice in the Iron Horse operations area, flowback gas from three wells was flared instead of vented. ✓

C. Level of Implementation

Other: Three green flowbacks were completed in 2008 in the Iron Horse operations area. 100% of the gas from the three green flowbacks was flared. ✓

D. Methane Emissions Reduction

Methane Emissions Reduction: 5,452 Mcf/year ✓

Basis for the emissions reduction estimate: Other ✓

In 2008 the Iron Horse operations area switched from CO2 fractures to cross link gel fractures. As a result of this operational change, the amount of CO2 in the flowback stream significantly decreased, and green flowback practices could be utilized. With the use of green flowback separators, the flowback stream was flared instead of vented. Field measurements estimated that the amount of gas not emitted each of the flowbacks was 2,582 Mcf gas = 1,933 Mcf CH4*, 1,496 Mcf gas = 1,120 Mcf CH4*, and 3,205 Mcf gas = 2,399 Mcf CH4* respectively. ✓

(*Assumes field gas is 76.39% CH4 & assumes 98% control efficiency for the flares.)

E. Are these emissions reductions a one-year reduction or a multi-year reduction?

✓ ✓ One-year

Multi-year

If Multi-year:

Partner will report this activity once and let EPA automatically calculate future emission reductions based on sunset date duration.

Partner will report this activity annually up to allowed sunset date.

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**F. Cost Summary**

Estimated cost of implementing the PRO (including equipment and labor): \$ 0

G. Total Value of Gas SavedValue of Gas Saved: \$ 0 ? ~~(2044.77)~~ ✓ Flared

\$ / Mcf used: \$ 3.75

H. Planned Future Activities

To what extent do you expect to implement this PRO next year?: NEI will continue using green flowbacks in Iron Horse in 2009. ✓

Previous Years' Activities

Year	Frequency of practice/activity or # of Installations	Total Cost * (\$)	Estimated Reductions (Mcf/Yr)	Value of Gas Saved (\$)

* Total cost of practice/activity (including equipment and labor)

Additional Comments

Please Note: ✓

1) A value of \$0 was entered for the cost of implementing this PRO because there is minimal additional cost associated with the green flowbacks compared to the alternative practices NEI would implement in the Iron Horse operations area instead.

2) A monetary value for the value of gas saved from this activity was not reported because as described, the gas was flared instead of being used in a beneficial way. The amount of methane was reduced through the use of this practice, so it qualified for reporting; however, the gas was not used in a beneficial way, so a corresponding monetary value was not calculated. ?

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Additional Accomplishments

NEI intends to develop a Rewards and Recognition Program as part of NEI's internal training program. This program will provide incentives to NEI employees for identifying and implementing methane emission reduction projects. This program will emphasize NEI's commitment to reducing methane emissions as well as give employees a vested interest in quantifiable reductions.

NEI purchased a FLIR camera to use in a directed inspection and maintenance pilot project in the Wattenberg Field. Wattenberg operations personnel developed a standard operating procedure and began inspections and corresponding maintenance activities in March 2009. NEI expects that the emission reductions corresponding to this program will be reported in NEI's 2010 Annual Report. ✓

In 2008, the Iron Horse operations area started using gel instead of CO2 to fracture. This new practice resulted in a flowback stream with much less CO2, so the flowback stream could be sold or combusted instead of vented as before. In 2008, most of the flowback gas generated using the new frac method was flared. As these new operations are further developed in 2009, NEI plans to sell the flowback stream, and the related methane reductions will be quantified and reported.

NEI has a minimal number of glycol dehydrators (about 10-20), most of which are presently equipped with flash tanks. NEI plans to quantify the reductions related to these flash tanks as well as potentially equip additional dehydrators with flash tanks. However, many of NEI's dehydrators utilize flash tanks in order to meet regulatory requirements and thus are not eligible for Gas Star reporting.